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66TH CONGRESS, 1st Session. | SENATE. | DOCUMENT No. 116.

American-Canadian fisheries conference.

SOCKEYE SALMON FISHERY CONVENTION.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

TRANSMITTING

A COPY OF A COMMUNICATION FROM THE SECRETARY OF STATE SUBMITTING A COPY OF THAT PORTION OF THE REPORT OF THE AMERICAN-CANADIAN FISHERIES CONFERENCE CONCERNING THE REHABILITATION AND PROTECTION OF SOCKEYE SALMON OF THE FRASER RIVER SYSTEM.

SEPTEMBER 30, 1919.—Read; injunction of secrecy removed, referred to the Committee on Foreign Relations, and ordered to be printed.

To the Senate:

I transmit herewith for consideration in connection with the Sockeye Salmon Fishery Convention recently submitted to the Senate, a copy of that portion of the report of the American-Canadian Fisheries Conference concerning the rehabilitation and protection of sockeye salmon of the Fraser River system.

WOODROW WILSON.

THE WHITE HOUSE,
29 September, 1919.

The President:

The undersigned, the Acting Secretary of State, has the honor to lay before the President, with a view of its transmission to the Senate for consideration in connection with the Sockeye Salmon Fishery Convention recently submitted to the Senate, a copy of that portion of the report of the American-Canadian Fisheries Conference concerning the rehabilitation and protection of sockeye salmon of the Fraser River system.

Respectfully submitted.

WILLIAM PHILLIPS.

DEPARTMENT OF STATE,
Washington, September 24, 1919.

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Rehabilitation and Protection of the Sockeye Salmon of the Fraser River System.

For the purposes of the sockeye salmon fishery, the Fraser River system embraces not only the Fraser River itself and its estuary, but the southern portion of the Gulf of Georgia, Washington Sound, and Juan de Fuca Strait.

Five species of salmon frequent this system, viz, the sockeye, the chinook or spring, the coho or silver, the pink or humpback, and the chum or dog. There is also the steelhead, which, though not of the same genus, is commercially regarded as a salmon.

Of these, the sockeye has always been the most valuable on the market as a canned fish. Its flesh is of a much deeper color and more oily than that of the other species. Moreover, the Fraser River system sockeye is the choicest of its kind, and brings a higher price than the sockeye of any other region.

All these species are anadromous. That is, they run up from the sea to spawn, and the young are hatched out in the fresh waters of the streams and lakes, from which they descend to the sea while young. The fish remain at sea until they reach maturity and then return to the fresh waters to spawn. A peculiarity of all the Pacific salmons is that they die after spawning, so that they never reproduce more than once.

The salmon return to the watershed in which they were hatched. Indeed, the theory is now commonly held and has much to support it that they return not only to the same watershed but to the identical stream or tributary of a stream in which they were born. Thus each watershed, and possibly each stream, presents its own problem; and so it is that the Fraser River system of salmon fisheries may fail or improve without affecting, one way or the other, the fisheries of the neighboring areas.

While salmon of all five species spawn in the Fraser River Basin and in streams of Washington, Vancouver Island, and the mainland of British Columbia, the sockeye resorts almost exclusively to the Fraser for spawning purposes; and it is the sockeye and its fishery which at this time constitute the most important international question affecting the fisheries of the Pacific coast of the two countries.

A small run of sockeye salmon resorts to the Skagit River, in Washington, but it is relatively unimportant, and its commercial possibilities, owing to the restricted area of the spawning grounds, are sharply limited. For all practical purposes, it may be said that all the sockeye salmon that enter Juan de Fuca Strait from the ocean originated in the Fraser and are making their way back to it to reproduce and die.

In coming from the ocean, these fish enter the strait on both sides of the boundary line, but after reaching the vicinity of the southern extremity of Vancouver Island the great majority pass over to the United States waters and do not emerge therefrom to any noteworthy extent until they have passed through the channels among the United States islands in Washington Sound. Thus it is that while these fish were hatched in the Fraser River and are proceeding back to it, by far the largest catches have been made in the

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United States waters. Usually 66 per cent or more of the total catch is taken in the State of Washington.

The Fraser River is potentially the greatest sockeye-producing stream on the Pacific coast. Its tributary lakes and rivers cover an area larger than that of any other stream on the Pacific slope. Under normal conditions of the fishery, the spawning sockeyes, overcoming what are apparently insurmountable rapids and falls, ascend for hundreds of miles and proceed right to the headwaters of the Fraser as well as to the headwaters of its tributaries.

A curious phenomenon of the Fraser River that has occurred at least since the earliest records—those of its discoverer, Simon Fraser—covering the period from 1806 to 1811, is an extraordinarily heavy run of sockeyes every fourth year, followed by three years of small runs, so that the seasons have come to be known as "big years" and "off years" or "lean years."

What the cause of this was no one can say with finality. There are different theories. The most probable is that at some time prior to 1806 there came down from the mountains into the narrow portion of the river at Hells Gate Canyon, or vicinity, a slide which entirely, or at least almost entirely, blocked the ascent of the salmon, and that it took three years for the pressure and rush of the water to sufficiently wear away the obstruction to enable the salmon to pass, so that in those three years the only sockeyes that effectively spawned were those that normally resorted to the comparatively small portion of the system below Hells Gate. This theory is strongly supported by the experience of 1913, which will be referred to later.

The sockeye of the Fraser River are predominantly 4-year fish; that is, they reach maturity and return to the river to spawn and die when they are 4 years old. It has been ascertained by Dr. Charles H. Gilbert, the most eminent authority on the Pacific salmons, that a part of the runs each year consists of 3-year and 5-year fish, although the percentage of such is small. This being the case, it is easily possible to account for the presence of a limited number of fish on the spawning grounds above Hells Gate during the "off years" without invalidating the theory, for there would be a proportion of these fish that would not return to the upper spawning grounds during the fourth year of the cycle of the obstruction, but would come back in three or five years and thus begin to build up the "off years."

As commercial fishing did not begin to any extent until 1876, it is a surprising and disconcerting fact that the "off years" which were known to have existed so far back as 1806 were not built up to a greater extent.

The year following the inception of commercial fishing on the Fraser River the industry began in Washington (in 1877). For many years sockeyes were the only species canned; and, as the market for them increased, fishing for them was carried on more intensively. While the "big-year" runs were so enormous as to be unaffected by the immense catches made during them, the "off years" soon began to show coming exhaustion. As the fishery declined, the demand went up, and greater efforts were made to increase the output. More and more efficient equipment was used, until, had it not been for the weekly close time, when all fishing was required to be abandoned

for a given period so as to give the fish a free run to and up the Fraser River, it does not seem that any appreciable number could have escaped. The fish are met as far out to sea as they can be located with purse seines. Nearly 500 of these great nets were in use in Juan de Fuca Strait and among the islands in Washington Sound last year (1917). Then nearly 200 traps were placed in their path along the shores of Washington and among the United States islands in the sound as well as a few on the west side of Vancouver Island. Some gill nets ranging up to 3,000 feet in length were in use in the United States waters, and in the river itself and its estuary over 2,600 gill nets, each 900 feet long and 60 meshes deep, were used.

The Fraser is fished more intensively in proportion to its area and to the supply of sockeyes running therein than are the waters of Juan de Fuca Strait and Washington Sound. The combined length of the nets operated on the Fraser in 1917 was over 445 miles, of which about 400 miles were used in the 15 miles of river between its mouth and New Westminster Bridge. The degree of this intensity is indicated by the fact that for every square mile of river there were in the section below the bridge more than 30 linear miles of nets. In the year 1914 the total number of gill nets in use on the Fraser River was in excess of 3,000.

In the development of the fishery, the comparatively light runs of the "off years" were having a greater and greater proportion taken from them, so that fewer and fewer fish were reaching their spawning grounds. The result was inevitable. The fishery is now verging on exhaustion. The depletion of the spawning grounds above Hells Gate, where during the "off years" the number of fish had always been comparatively small, became so marked as to make it necessary since 1913 to close for want of an egg supply the hatcheries established there by the Canadian Government, and thus the river, during the "off years" was back once more to almost complete reliance on the spawning grounds below Hells Gate.

For years past, the success of the sockeye industry in this district has depended on the "big year" runs. Several of the canneries on both sides of the line were idle during some of the "off years," and some of them, more recently, have operated only in "big years." In 1913, however, which was a "big year," a disaster occurred which put an end, at least temporarily, to the "big-year" runs and reduced them to the dimensions of an average "off year." In Hells Gate Canyon there was a small bay-like indentation just above the "gate" which, it subsequently transpired, afforded the only available resting place to enable the salmon after rushing through the "gate" to gather their strength sufficiently to proceed through the remainder of this difficult canyon. Blasting operations in the construction of the Canadian Northern Railway roadbed along the side of the canyon caused this resting place to become so filled by rock slides that the salmon could not resort there, and so were carried back below the "gate" by the force of the current. This obstruction was formed shortly before the heavy run of salmon began. As soon as it developed that the salmon were being held back, the best engineers available were sent to the spot to consult on the quickest means of overcoming the difficulty. Work was immediately started to clear the obstruction, and a tem-

porary sluiceway to enable salmon to pass up was constructed. Some fish got through this, others were carried beyond by hand, and some got up at the time of high water at the beginning of the run, but not more in the aggregate than in a good "off year," so while the removal of the obstruction was pressed along with all possible energy, it could not be completed in time to save the situation.

Countless thousands of sockeyes wore themselves to death in repeated fruitless efforts to get beyond the gate, their instinct compelling them to keep on trying instead of falling back and going up the lower tributaries, as is evidenced by the fact that these spawning areas were not more thickly resorted to by sockeyes than in other "big years."

Many of the persons engaged in the salmon business clung to the hope that, after all, sufficient sockeye had got up to maintain the "big year," and preparations were made by such accordingly for 1917, the returning year of the cycle, but only to find that their hope was vain and that the "big year" was a thing of the past, unless extraordinary measures are taken to restore it.

The fact that these fish pass through the waters of the two countries makes it impossible to properly protect them by independent action. The fishermen of either side are inclined to operate to the limit when the fish are in their waters and place the responsibility for untoward results on those of the other country.

How the fishery has declined will be realized from the following statement of the packs of sockeye salmon for a series of years:

Year.	Number of cases.		Total number of cases.	Year.	Number of cases.		Total number of cases.
	Fraser River.	Puget Sound.			Fraser River.	Puget Sound.	
1902	293,477	372,301	665,778	1911	58,487	127,761	186,248
1903	204,809	167,211	372,020	1912	108,784	184,680	293,468
1904	72,688	109,264	181,952	1913	684,596	1,673,099	2,357,695
1905	837,489	825,453	1,662,942	1914	185,483	335,230	520,713
1906	183,007	178,748	361,755	1915	89,040	64,584	153,624
1907	59,815	93,122	152,937	1916	27,394	84,637	112,031
1908	63,126	170,951	234,077	1917	123,614	411,538	535,152
1909	542,248	1,097,904	1,640,152	1918 (estimated)	15,000	50,000	65,000
1910	133,045	248,014	381,059				

Two facts are outstanding:

(1) The yearly possibilities of the Fraser River must be measured by the conditions in the "big years." All that is needed to produce the run of a "big year" any season is to have the spawning beds of the whole system seeded as plenteously as in the "big years" of the past. The river is as free from pollution or artificial obstruction as it ever was, and all the conditions for successful spawning are as favorable as in early times. The only deficiency is in the spawning fish.

(2) Unless drastic action is taken, internationally, to save the situation, the fishery will become commercially exhausted in a few years. The figures for 1918 clearly evidence this.

It would be an international calamity, involving almost criminal neglect on the part of both countries, if the latter condition were allowed to obtain. On the basis of the present prices, the sockeye

progeny of this river should be producing, annually, a food worth over $30,000,000, this figure being based on the actual pack of the last "big year," 1913. As it is, the average value for the four years ending 1918 is about $3,000,000.

In the face of the foregoing, and in view of the fact that there can be no question but that the river can be restored by the proper procedure, so that it will produce to maximum capacity every year, it is confidently believed that the interests in the two countries will stand behind the authorities of both in procuring the necessary action to bring this about.

Efforts have been made in the past for mutual arrangements to afford adequate protection, but without success. The most important of these was in connection with the treaty of 1908, for the international protection of the fisheries in the contiguous waters along the entire boundary line. This treaty failed, owing to the fact that the United States Congress refrained from approving the regulations drawn up under its provisions, though they had been approved by the Parliament of Canada. But even if the regulations under that treaty had been approved and made effective, they would not have met the present requirements.

The situation is surrounded by outstanding difficulties, and great mutual concessions and forbearance must be exercised by those engaging in the industry on both sides of the line, if the necessary steps to restore the fishery are to be taken.

In British Columbia the fishery interests feel very strongly that they have been in an unfair position all through the past years. They point out that while all the fish are bred in the Fraser River, the fishermen have been sharply restricted in their operations, being allowed to use gill nets only, in addition to having to submit to a longer weekly close time than is effective in the State of Washington; while their competitors have been permitted to use traps and purse seines, much more capable and economical fishing appliances than gill nets; and they urge that while the fish are bred in Canadian waters, and must there be properly protected if the fishery is to be saved from depletion, they obtain only one-third or less of the total catch. They contend that they have been called on to do too much of the protecting and are entitled to a more equitable proportion of the fish.

On the other hand, the fishing interests of the State of Washington contend that they have not been taking unreasonable advantage of their more favored geographical position; that the quantities of fish caught have not been out of proportion to the area of the fishing grounds, the amount of capital invested, and the number of persons dependent on and engaged in the fishery; that the fishing appliances used are suited to their waters, and are not only of a character that can be efficiently and adequately regulated, but they are so regulated as to admit of a reasonable escapement of fish to the waters beyond.

Both sides, however, fully realize the absolute need for international action, and are prepared to make sacrifices in order to assure relief. While the proper disposition for essential action may have been lacking in the past, it seems now to obtain. The interests on both sides of the line are fully alive to the conditions, and they are evidently prepared to cooperate to save the industry.

While the Canadian Government is fully able to cope with the situation in British Columbia, it is recognized by the commissioners of both countries that a different condition exists in Washington because of the jurisdiction of that State over the fisheries. The American commissioners have no desire to impair or invade the powers which the State of Washington exercises over the fisheries; they realize that any proposed remedial action, to be effective, should receive the official support of the State and the general approval of the local public opinion.

As regards any particular remedial action that may be proposed, it must be conceded that it is impossible to state with certainty what the full results may be or when they may be achieved, because the experience is lacking on which reasonably safe predictions can be based. Therefore, taking cognizance of the best information available, it will be necessary to adopt a tentative course in the expectation that after proper trial new measures or modifications may be required. In fact, in view of the rapidly changing conditions under which the salmon fisheries are now conducted, it would be strange if modifications in laws and regulations were not demanded at comparatively short intervals. Hence action so drastic as to cause a virtual suspension of the industry would not, in the opinion of the commissioners, be justified at this time.

The honorable commissioner of fisheries for British Columbia has recommended that the two Federal Governments take over the fishery and compensate any who might be found entitled to such owing to this action, so that the Governments might be free to regulate the fisheries without interference and operate them in the interests of the two countries. This course has much to commend it, but your commissioners feel that at this time and under existing conditions it is not feasible. Furthermore, in the case of the United States, there is no way known to the commissioners by which the Federal Government can acquire, by purchase or otherwise, fishery rights that are vested in the several States, unless such rights are voluntarily relinquished by the States.

Some of the specialists on the natural history of the salmons recommended that all sockeye fishing be stopped for a term of years, but in the light of the facts (1) that they regard one cycle, or four years, as the minimum closure and that two, three, or more cycles would likely be found necessary; (2) that as this course would force the closing of many canneries and render them worthless (the evidence shows that the machinery of a cannery will become scrap in five years if unused); (3) that as it would be impossible to stop all fishing during a sufficiently long period to cover the sockeye run without interfering with the spring salmon fishery each year and with the pink salmon fishery at least every second year; and (4) that as the fact that the "off years" were not built up to anything like "big-year" proportions during the long period known to have elapsed since the "off years" have existed and before commercial fishing began, thus leaving little ground for hope for speedy results from this course alone, your commissioners are not prepared to indorse this recommendation, at least until the trial of other methods has failed to yield reasonably effective results.

The stopping of all salmon fishing long enough to allow an escapement of 50 per cent of the sockeye run in both the State of Washing-

ton and British Columbia was favored by most of those engaged in the industry on both sides of the line as a basis for international action, though it developed that there is considerable difference of opinion as to how this can best be done. It was suggested in the State of Washington that a closure of all fishing from July 20 to 31 on the United States side, and from July 25 to August 5 in British Columbia, so as to allow for the time that presumably would be taken by the salmon in passing from the strait to the Fraser River, would achieve the end in view; but this proposition was vigorously opposed in British Columbia, on the ground that the difference in dates is too long and that it is doubtful if any such sliding scale would be justifiable, in view of the lack of positive knowledge regarding the movements and rate of travel of salmon.

Very material progress in the study of the life history of the sockeye has been made in recent years, but there is yet a great deal to learn. This can only be done by comprehensive and sustained study on the spawning grounds as well as otherwise.

Salmon hatcheries have been in operation for years, and have turned out tens of millions of active, healthy fry annually, but neither in Canada nor the United States can sufficient results be pointed to so far as the runs of sockeye are considered. This is not the case with all species. Hatchery work supported by reasonably provident regulations must, for instance, be given the credit for restoring the chinook salmon fishery of the Columbia River, but the chinook or spring salmon is a different species with different habits of both adults and young. The young of the chinook salmon can readily be held at the hatcheries until they are several months old and have reached a size when they are strong, active, and fairly capable of protecting themselves against natural enemies. So far, however, efforts that have been made at the Fraser River hatcheries to similarly retain young sockeye have not been successful, but information as to why this should not be so and how it can be overcome is lacking.

New methods of hatching by the ingenious use of gravel in a manner that largely reproduces the conditions of natural spawning grounds are being tried with considerable promise of success by the officer in charge of the Canadian Government Hatchery at Harrison Lake, on the lower Fraser; and it is possible that through these and other such experiments the present methods of sockeye hatchery operations may be revolutionized or at least vastly improved.

The fact that in all the "big years" of the past the spawning areas of the Fraser system, above as well as below Hell's Gate, were abundantly seeded, while in the "off years" the upper areas were very lightly seeded, though normal seeding took place in the lower areas, indicates the necessity through hatchery or other methods of restoring the runs to the upper waters, if this fishery is to be rehabilitated.

Further direct aid to the fisheries may be afforded by the systematic reduction in the numbers of predatory fishes that frequent the spawning grounds. There seems little room for doubt, in the light of the evidence before the Commissioners, that the destruction of the eggs and young of salmon on the natural spawning grounds chiefly by other fishes is appalling. The mutilation and destruction by seals and sea lions of mature salmon on their way to the Fraser River is likewise large and serious, and its mitigation would have a highly

beneficial effect on the supply, especially at this critical stage of the industry.

The foregoing considerations serve to emphasize the urgent need for comprehensive and continuous observation and study by experts, and indicate that in the meantime any action which would put the fishermen and canners entirely out of business would not be justified.

In the light of all the existing conditions, your commissioners are of the opinion that a treaty or convention for the proper regulation and protection of this fishery should forthwith be entered into by the two countries; that commissioners should be appointed, under this treaty, to thoroughly study the situation, and that they should have to assist them two experts, one appointed by the Government of each country, who should conduct continuous investigations into the life history of the sockeye, hatchery methods, eradication of natural enemies on the spawning grounds and in salt water, and other related subjects; and also that the sockeye hatchery operations on the Fraser should be inspected by the commissioners so appointed.

Your commissioners also recommend that the commission to be appointed cause an examination by competent engineers to be made of the sides of the Fraser River, at Hells Gate, and at other places where slides into the river that might bar the ascent of salmon are probable, such examination being for the purpose of ascertaining what may be feasible to avert such danger.

It is the judgment of your commissioners that the hatchery work on the Fraser River system should be extended as rapidly as available supplies of eggs will warrant, by the establishing of new hatcheries on spawning areas now being sparsely seeded, and that to this end eggs of sockeye and possibly other species of salmon be made available from waters of the United States, as well as from other Canadian waters, for the Fraser River hatcheries, to as large an extent as practicable.

It is also important that the two Governments arrange to ascertain accurately how long it takes sockeye salmon from the time they enter Juan de Fuca Strait to reach and enter the Fraser River, and as far as possible to pass from point to point along the said strait and the Gulf of Georgia.

And also that the two Governments arrange to carry on investigations and experiments with a view to finding some feasible means of overcoming the seal and sea-lion menace to the salmon fisheries in the treaty waters, and if such means be found to put them into operation.

Your commissioners append a draft of a proposed treaty (Appendix A) and of regulations thereunder for the restoration and protection of this fishery (Appendix B), the adoption of which, subject to such modifications in terms as the responsible officers of the two Governments may consider desirable, is urgently recommended.

These regulations will enable the industry to be conducted on a diminished scale for the next eight years. They will afford a much greater escapement of fish to the spawning grounds than has been the case heretofore; and they will enable observation as to the results, which will begin to show themselves in 1923 if, as contemplated, the regulations become effective in 1919. With the information that will

then be before them, the commissioners will be in a position to know whether further restrictions are needed or what modifications in the regulations are desirable.

In connection with these regulations, it may be useful to make the following notes in regard to those that are exceptional in their character:

Section 5 will have the effect of stopping all fishing by Indians above the tidal boundary for commercial fishing. From time immemorial it has been the practice of certain tribes of Indians to provide their winter supply of fish for themselves and their dogs by catching salmon by spearing and otherwise as they were passing through difficult channels in the upper reaches of the rivers and on the spawning grounds themselves. The number of fish so taken has, in the aggregate, been very large, and it was stated in the hearings that the number of salmon eggs consumed by the Indians annually would offset the operations of several hatcheries. Having regard for the value of each fish that succeeds in escaping all the appliances of the commercial fishermen and reaching the spawning areas and its importance in maintaining the volume of the runs this Indian fishing is far from an economical method of supplying their food requirements. There exists prejudice on the part of the Indians to using fish prepared otherwise than in the manner followed by them, but keeping in view the welfare of the salmon fisheries this prejudice should be overcome or should be considered of secondary importance.

Every reasonable facility and encouragement should be given the Indians to catch necessary supplies of salmon for their family uses in the tidal waters and to transport them to their homes, but should it be found necessary for the proper authorities to furnish them with certain quantities either in a canned or cured form, it seems reasonable that the canning and fresh-fish interests on both sides of the boundary should cooperate in providing such food.

The annual close season provided for by section 6 is designed to give the sockeye a free run to their spawning grounds during a portion of the time when the run is heavy. This protection is additional to that afforded by the present weekly close season, and it is anticipated that approximately a number of fish equal to 50 per cent of the usual pack will thus escape to the spawning grounds.

In the absence of final information as to the speed at which sockeye travel, after entering Juan de Fuca Strait and until they reach the Fraser, your commissioners do not feel justified in recommending any difference in the time of beginning and ending of this close period in either country. As will be noted in the recommendations forming part of this report, your commissioners urge, however, that the two Governments take the necessary steps to procure this information.

A beginning of this work has been made during the present year (1918). It may be found that if any difference is desirable, it should be provided not only so far as the United States and Canadian waters are concerned, but as between different fishing regions in each country. The blanket method is obviously much more desirable from an administrative standpoint, and the fact that the fish are distributed over a large area while active fishing is going on, so that if all nets are lifted at one time fish that are in the river at that time will escape above the fishing limits, may render it uncertain

whether in the long run there is any real advantage in a progressive close season.

It is urged by several witnesses that this annual close time should be established in lieu of the weekly close time. It is certain, however, that the good effects of the proposed annual close time would be practically nullified if this were done. Both the proposed annual and weekly close times together can not be relied upon to permit the escapement of more than 50 per cent of the fish. This is clearly shown by figures for a series of years furnished for the purpose by the associations acting in behalf of the fishery interests on both sides of the boundary. These figures for British Columbia are complete, for Puget Sound they cover the catch handled by only a portion of the canneries, but are offered by the Washington Fisheries Association as being typical of the entire catch. Assuming that this is correct, the percentage of the total catch taken during the period from July 20 to 31, inclusive, on the two sides was as follows for each of the years indicated:

	Per cent.
1914	28.44
1915	16.31
1916	36.99
1917	40.10

The total quantity packed during these 12 days in the 4 years named would be 32.2 per cent of the total pack for these years. The weekly close time provided by the proposed regulations, namely, 36 hours, is 21.4 per cent of each week. Assuming that during these four years there had been no weekly close time, the catch during these 36 hours per week would have added 15.5 per cent to the pack. Combining this figure with the 32.5 per cent for the 12-day periods would give an escapement of 51 per cent of the packs during both the annual and weekly close times. It is not claimed that these figures represent exact conditions, as there are various unknown factors, but they are a fair deduction from the figures submitted.

There can be no question that the toll taken in the past "off years" has been far too great to maintain the runs, even at their present proportions, and that a much larger escapement of fish to the spawning areas must be assured if the annually declining runs are to be turned into annually increasing runs.

Fishing is now permitted in the Fraser River up to Mission Bridge, about 50 miles from its mouth, although fishing from New Westminster Bridge, 12 miles above its mouth, to Mission Bridge is limited to residents along that portion of the river. The evidence shows that the fishermen in this area make practically their whole catches in the first two or three days following the weekly close time; or, in other words, when the mass of nets below the bridge gets into full operation too few fish escape beyond it to make the fishing above worth while.

On the other hand, the fishermen above the bridge are bona fide residents, who settled there with a view to the fishing, on which they depend to an important degree to enable them to become established on the land. In the circumstances, your commissioners feel that it would be unfair to deprive these people of all fishing privileges, but it is evident that the fish must have more protection.

It is, therefore, recommended that the weekly close time above the bridge be 24 hours longer than below it, and that other restrictions be thrown around the exercise of the fishing privileges in this region.

The proposed method in section 7 of arranging the traps during the close time is that required in the Columbia River. The opinion is fairly general that, with jiggers attached to the traps, the mere closing of the entrance for a short time does not assure that salmon will escape, which is the sole object in view, but rather that they will play between the leader and the jigger until the trap is again opened. By opening a portion of the lead, in addition to closing the trap, the fish will be given a much better chance to move onward.

Sections 9 and 10 relate to purse seines. At the present time purse seines may be operated right up to the entrance to a trap. The purse seiners urge that as the trap is in fishing order during the whole fishing season, both night and day, excepting when it is being lifted, and that purse seines can be used only in the day and when evidences of fish are visible, the existing provision of law is fair and should be continued.

Your commissioners do not so regard the matter. The trap is a stationary appliance, and so can only take the fish that come to it, whereas the purse seiner can follow a school of fish in all portions of the area where fishing is permitted. In the circumstances, to require purse seiners to refrain from casting their nets within 2,400 feet of a stationary fishing appliance is not a hardship.

The use of purse seines in the narrow channels among the islands in Washington Sound and the Gulf of Georgia should not be permitted. Such seines can be so used in these passages as to practically block them and so prevent a reasonable escapement of the run of fish. Their use might as fairly be permitted in the Fraser River itself. The purse seine is an extremely capable fishing device, and from its very nature should be restricted to the open waters.

The other proposed regulations involve no new principles, and therefore need no special comment.

In closing consideration of this matter, your commissioners again emphasize the vast importance of this fishery to both countries. Every year's delay means added depletion that will require several years longer of sharp restriction to undo, while, on the other hand, immediate action will assure much more speedy recuperation, as there will be a larger body of fish to work with, and thus hasten the return of the day when the river system will be producing over 2,300,000 cases of sockeye, not only one year in four but every year, instead of about one-fifth of that quantity, which, under existing conditions, must rapidly grow less and less.

Your commissioners gratefully acknowledge the generous and capable assistance afforded by the local fishery authorities, interests, and associations, and especially by Commander Miller Freeman, publisher of the Pacific Fisherman; Frank Warren, president of the Association of Pacific Fisheries; Mr. L. H. Darwin, commissioner of fisheries for Washington; Lieut. Col. F. H. Cunningham, chief inspector of fisheries in British Columbia for the Federal Government of Canada; John P. Babcock, assistant to the provincial commissioner of fisheries; and Dr. A. McLean Fraser, the representative of the Canadian Biological Board in British Colum-

bia. These gentlemen voluntarily served with the subcommittee of your commissioners in considering a proper system of regulations for this fishery, and so greatly facilitated the inquiries and findings of your commissioners.

Appendix A.

TREATY BETWEEN GREAT BRITAIN AND THE UNITED STATES CONCERNING THE SOCKEYE SALMON FISHERIES OF THE FRASER RIVER SYSTEM.

Whereas the Governments of Canada and the United States, realizing the necessity for joint action in the protection, preservation, and propagation of the sockeye salmon of the Fraser River system referred the question to an international joint commission appointed by the respective Governments in December, 1917, to consider a settlement of outstanding questions affecting the fisheries between the two countries; and

Whereas the said commission having investigated the matter recommended the adoption and enforcement by the two countries of the regulations appended hereto and the appointment of an international fisheries commission to conduct investigations into the life history of the salmon, hatchery methods, spawning ground conditions, and related matters, and to observe the effects thereof and to recommend any modificatins thereof or additions thereto which may in the light of experience be found desirable;

His Majesty George V of the United Kingdom of Great Britain and Ireland, and the British Dominions beyond the seas, King and Emperor of India, and the President of the United States of America, having resolved to enter into a treaty thereto, have for that purpose appointed

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who having exchanged their full powers, found to be in due form, have agreed to and signed the following articles:

Article 1. The times, seasons, and methods of sockeye salmon fishing in the Fraser River system, as specified in article 3 of this convention, and the nets, engines, gear, apparatus, and appliances which may be used therein shall be limited to those specified in the system of regulations appended hereto.

Art. 2. The two Governments engage to put into operation and enforce by legislative and executive action, with as little delay as possible, the said regulations, restrictions, and provisions, and such others as may from time to time be adopted by the two Governments; and the date when they shall be put into operation shall be fixed by concurrent proclamations of the Governor General of the Dominion of Canada in council and of the President of the United States.

Art. 3. It is agreed that the aforementioned regulations will apply to the waters included within the following boundaries: Beginning at Carmanagh Lighthouse on the southwest coast of Vancouver Island, thence in a straight line to a point three marine miles due west astronomic from Tatoosh Lighthouse, Washington, thence to said Tatoosh Lighthouse, thence to the nearest point of Cape Flat-

tery, thence following the southerly shore of Juan de Fuca Strait to Point Wilson, on Quimper Peninsula, thence in a straight line to Point Partridge on Whidbey Island, thence following the western shore of the said Whidbey Island, to the entrance to Deception Pass, thence across said entrance to the southern side of Reservation Bay, on Fidalgo Island, thence following the western and northern shore line of the said Fidalgo Island to Swinomish Slough, crossing the said Swinomish Slough, in line with the track of the Great Northern Railway, thence northerly following the shore line of the mainland to Point Grey at the southern entrance to Burrard Inlet, British Columbia, thence in a straight line to the southern end of Gabriola Island, thence to the southern side of the entrance to Boat Harbor, Vancouver Island, thence following the eastern and southern shores of the said Vancouver Island to the starting point at Carmanagh Lighthouse, as shown on the United States Coast and Geodetic Survey Chart No. 6300, as corrected to July 20, 1918, and also the Fraser River and its tributaries.

The two Governments engage to have prepared as soon as practicable charts of the waters described in this article, with the international boundary line indicated thereon, and to establish such additional buoys and marks for the purpose of this treaty as may be recommended by the commission referred to in the following article:

ART. 4. The high contracting parties agree to appoint a commission, to be known as the International Fisheries Commission, consisting of four persons, two to be named by each Government, to conduct investigations into the life history of the salmon, hatchery methods, spawning-ground conditions, and other related matters, and to observe the effects of the said regulations and to recommend to their respective Governments any modifications of or additions to the aforementioned regulations which may in the light of experience be found desirable.

ART. 5. The International Fisheries Commission shall continue in existence so long as this convention shall be in force, and each Government shall have the power to fill and shall fill from time to time any vacancy which may occur in its representation on the commission. Each Government shall pay its own commissioners, and any joint expenses shall be paid by the two Governments in equal moieties.

ART. 6. This convention shall remain in force for a period of 15 years, and thereafter until two years from the date when either the Government of Great Britain or the Government of the United States shall give notice to the other of its desire to terminate it.

ART. 7. The regulations, restrictions, and provisions provided for in this convention shall remain in force for a period of eight years from the date of their executive promulgation, and thereafter until one year from the date when either the Government of Great Britain or of the United States shall give notice to the other of its desire for their revision, and immediately upon such notice being given the commission shall proceed to make a revision thereof, which revised regulations, if adopted and promulgated, as provided by Article 2 hereof, shall remain in force, for a period of five years and thereafter until one year from the date when a further notice of revision is given as above provided in this article. It shall, however, be in the power of the two Governments, by joint or concurrent action upon

the recommendation of the commission, to make modifications at any time in the regulations, and to bring any or all of the other species of salmon, including steelhead, within the scope of such modified regulations.

ART. 8. The present convention shall be duly ratified by His Britannic Majesty and by the President of the United States, by and with the advice and consent of the Senate thereof, and the ratifications shall be exchanged as soon as practicable.

In faith whereof the respective plenipotentiaries have signed the present convention in duplicate, and have thereunto affixed their seals.

Done at in the year of our Lord one thousand nine hundred and eighteen.

APPENDIX B.

A SYSTEM OF INTERNATIONAL REGULATIONS FOR THE PROTECTION AND PRESERVATION OF THE SOCKEYE SALMON FISHERIES OF THE FRASER RIVER SYSTEM.

SECTION 1. The following regulations shall apply to the waters included within the following boundaries:

Beginning at Carmanagh Lighthous, on the southwest coast of Vancouver Island; thence in a straight line to a point 3 marine miles due west astronomic from Tatoosh Lighthouse, Wash.: thence to said Tatoosh Lighthouse; thence to the nearest point of Cape Flattery; thence following the southerly shore of Juan de Fuca Strait to Point Wilson, on Quimper Peninsula; thence in a straight line to Point Partridge, on Widbey Island; thence following the western shore of the said Whidbey Island to the entrance to Deception Pass; thence across the said entrance to the southern side of Reservation Bay, on Fidalgo Island; thence following the western and northern shore line of the said Fidalgo Island to Swinomish Slough, crossing the said Swinomish Slough in line with the track of the Great Northern Railway; thence northerly, following the shore line of the mainland to Point Grey, at the southern entrance to Burrard Inlet, British Columbia; thence in a straight line to the southern end of Gabriola Island; thence to the southern side of the entrance to Boat Harbor, Vancouver Island; thence following the eastern and southern shores of the said Vancouver Island to the starting point at Carmanagh Lighthouse, as shown on the United States Coast and Geodetic Survey Chart No. 6300, as corrected to July 20, 1918, and also the Fraser River and its tributaries.

SEC. 2. Interpretations: "Drift net" shall mean a floating gill net that is neither anchored nor staked, but that floats freely with the tide or current.

"Trap net" shall include a pound net.

"Commission" shall mean the International Fisheries Commission appointed under the treaty to which these regulations are appended.

"Treaty waters" shall mean all waters described in section 1 hereof.

SEC. 3. (*a*) Fishing for sockeye salmon in the treaty waters within the territorial limits of the State of Washington shall not be per-

missible except under license from such State and in the treaty waters of Canada, except under license under the provisions of the fisheries act of Canada.

(*b*) No greater number of licenses for any class of fishing appliance shall be authorized in any year in the treaty waters within the territorial limits of the State of Washington than were issued for such class for the season of 1918, up to August 31, inclusive thereof, and in the treaty waters of British Columbia the number of gill nets that may be licensed in any year shall not exceed 1,800.

(*c*) No license shall be granted to any person, company, or firm in the State of Washington, unless such person is an American citizen, resident in the said State, or to such company or firm, unless it is an American company or firm or is authorized to do business in the said State, and no licenses shall be granted to any person, company, or firm in the Province of British Colombia, unless such person is a British subject resident in the said Province, or such company or firm unless it is a Canadian company or firm, or is licensed to do business in the said Province of British Columbia.

(*d*) No one other than a British subject who owns or leases land on either side of the Fraser River above New Westminster Bridge, and who actually permanently resides on and is cultivating such land shall be eligible for a license to fish for sockeye salmon between New Westminster Bridge and Mission Bridge, but fishing under such license shall not be carried on below New Westminster Bridge.

SEC. 4. The use of nets other than drift nets, purse seines, and trap nets shall not be permitted in treaty waters for the capture of sockeye salmon.

SEC. 5. No net fishing or fishing of any kind other than with hook and line, excepting for hatchery purposes or scientific purposes, shall be permissible in the Fraser River above the down-river side of Mission Bridge.

SEC. 6. During the years 1919 to 1926, both years inclusive, no one shall fish for, catch, or kill any salmon from the 20th day of July to the 31st day of July in each year, both days inclusive; and during this close time no nets or appliances of any kind that will capture salmon may be used in these treaty waters: *Provided, however*, That salmon fishing for hatchery or scientific purposes may be authorized during this period.

SEC. 7. The weekly close time for salmon fishing shall be from 6 o'clock a. m., Saturday, to 6 o'clock p. m., Sunday, in Canadian waters, excepting in that portion of the Fraser River between New Westminster Bridge and Mission Bridge, where the weekly close time shall be from 6 o'clock a. m., Saturday, to 6 o'clock p. m., on the following Monday, and in United States waters from Friday at 4 o'clock p. m., to Sunday at 4 o'clock a. m., and during this close time no salmon fishing of any kind other than for hatchery or scientific purposes shall be permissible, and during the full period of each weekly close time or annual close season each trap net shall be closed by an apron placed across the outer entrance to the heart of the trap, which apron shall extend from the surface to the bottom of the water and shall be securely connected to the piles on either side of the heart of the trap net, fastened by rings not more than 2 feet apart on taut wires stretched from the top to the bottom of the piles, and such apron, or the appliance by which it is raised or lowered, shall be pro-

vided with a signal flag, which shall disclose whether the trap net is closed, and which shall be of the form and character approved by the commission: *Provided*, That in addition to the foregoing requirement, such trap net shall be equipped with a V-shaped opening, to the satisfaction of the commmission, in the lead of such trap net next to the entrance to the heart and immediately adjacent to the apron, of at least 10 feet in width at the top and extending below the surface at least 4 feet below low water, which V-shaped opening shall remain open and unobstructed during the full period of each weekly close time or annual close season.

For the purpose of securing full compliance with this regulation, the owner or operator of each trap net shall constantly maintain during the weekly and annual close times a watchman, whose duty it shall be to cause each trap net to be kept closed and the lead to be kept open, as above provided.

SEC. 8. All salmon trap nets shall be limited to a total length of 2,500 feet, with an end passageway of at least 600 feet between one trap net and the next linear series, such distances being measured in continuation of the line of direction of the leader of such trap net, but in no instance shall more than two-thirds of the width of any passageway at any point be closed by trap nets. There shall also be a lateral distance of at least 2,400 feet between one trap net and the next.

SEC. 9. A salmon purse seine shall not exceed 1,900 linear feet in length, including the lead and attachment, measured on the cork line when wet.

SEC. 10. (*a*) No purse seine shall be cast or placed in the water for fishing purposes within 2,400 feet of any trap net.

(*b*) The use of purse seines for the capture of sockeye salmon shall be confined to the treaty waters southward and westward of a straight line drawn from the lighthouse on Trail Island, British Columbia, to the northwest point of Whidbey Island, State of Washington.

SEC. 11. A salmon draft net shall not exceed 900 linear feet in length, and the vertical breadth thereof shall not exceed 60 meshes, and the size of the mesh shall not be less than $5\frac{3}{4}$ inches, extension measure, when in use.

SEC. 12. Any violation of these regulations in the treaty waters within the territorial limits of the State of Washington or within the treaty waters of Canada shall be punishable by the imposition of appropriate penalties to be provided by legislation in each country.

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